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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/018,401	04/10/2002	Nguyen Hoang	P07472US00/WEJ	1198

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EXAMINER

SONG, MATTHEW J

ART UNIT PAPER NUMBER

1765

DATE MAILED: 04/01/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/018,401		HOANG ET AL.	
	Examiner		Art Unit	
	Matthew J Song		1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>6</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 4 is objected to because of the following informalities: Claim 4 recites using “ $\text{Zn}(\text{S}_2\text{CRN}_2)_2$ ” in line 2, which is a clear typographical error because the instant specification only provides support for $\text{Zn}(\text{S}_2\text{CNR}_2)_2$. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Nomura et al (“Single source MOVPE of Zinc Sulfide Thin Films Using Zinc Dithiocarbamate Complexes”).

Nomura et al discloses a (111) oriented cubic zinc sulfide (ZNS) thin layer, this reads on applicant’s epitaxial film, grown on a Si(111) substrate by MOVPE using zinc Bis(diethyldithiocaramate) (Abstract). Nomura et al also discloses washing of the surface of the substrate, heating the substrate to 200-450°C and heating a source of zinc Bis(diethyldithiocaramate) to 25-300°C (pg 5). Nomura et al also discloses the optimum source temperature is 200°C and the optimum substrate temperature is 400°C (pg 6).

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Referring to claims 1 and 6, Nomura et al discloses a high quality zinc sulfide layer (pg 4) and the zinc sulfide layer is a strongly (111) orientated film (pg 6), this reads on applicant's epitaxial film. Furthermore, Nomura et al discloses a similar method of forming a high quality zinc sulfide layer using similar temperatures and precursors, as applicant, therefore the film taught by Nomura et al is inherently epitaxial.

Referring to claims 2, 7, 11-14 and 16-17, Nomura et al discloses a ZnS film of a (111) Si substrate (abstract)

Referring to claims 3-5 and 8-10, Nomura et al discloses zinc Bis(diethyldithiocaramate), this reads on applicant's zinc diethyldithiocarbamate.

Referring to claims 15, Nomura et al discloses washing the substrate (pg 5), this reads on applicant's cleaning a substrate, heating the substrate to 400°C, heating the source to a temperature of 200°C, this reads on applicant's sublimation and static pyrolysis of the precursor (pg 5) to form a strongly orientated cubic ZnS film (pg 6).

4. Claims 1-10, 12, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Cheon et al ("Gas Phase Photochemical Synthesis of II/VI Metal Sulfide Films and in Situ Luminescence Spectroscopic Identification of Photofragments").

Cheon et al discloses a photoassisted chemical vapor deposition of II/VI materials from pyrolysis with dithiocarbamate. Cheon et al also discloses the photochemical synthesis of binary metal sulfides from single source of zinc diethyl dithiocarbamate, $\text{Zn}(\text{S}_2\text{CNEt}_2)_2$. Cheon et al also discloses a reservoir cell was heated under vacuum to a sublimation temperature of approximately 170°C and films were grown on quartz substrates. Cheon et al also discloses the

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ZnS thin films are highly c-axis orientated materials, this reads on applicant's epitaxial film. (pg 3838).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nishio et al (US 6,211,043) teaches a metal organic compound of Zinc dithiocarbonate (col 7, ln 35-55) and vaporizing the organic compound to form a compound semiconductor (claim 1).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
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MJS

March 25, 2003



ROBERT KUNEMUND
PRIMARY EXAMINER